

Watthour

Device Description: _____

Contact Name: _____ Phone: _____

Company: _____ Address: _____

E-mail: _____ City: _____

Instructions For Completing Pre-Evaluation Checklists

You will usually need to complete **both** the “General” checklist and the specific checklist which is most applicable to your device or system type. For example, for a weighing device or weighing system the “General” checklist (which applies to all device types) and the “Scales” checklist should be completed. Both the “General” and “Watthour Meter” checklists should be completed and submitted with an electric watthour metering system application.

The exceptions are the computer software/hardware component pre-evaluation checklists which have the “General” requirements incorporated in them. Use the checklist for computer systems connected with either scales or measuring systems. Only one pre-evaluation checklist will be needed unless the software will be connected to both types of systems

These checklists include requirements extracted from the California Code of Regulations. Though not all-encompassing, the checklists contain requirements beyond those which would apply to any single device type or accessory. It is best to think of a device type as a weighing or measuring device system or as a component of such a system whichever best describes the device(s).

When applying the requirements to your device you have three options; Check

- YES** If your device or system complies
- NO** if the device or system does not comply.
- NA** if sections appear not to apply to the device or system type(s)

If selecting “**NO**”, consider if your device or system is ready for evaluation. If the deficiency is of such a nature that it will not effect the ability to test for accuracy, such as failure to conform with marking requirements or lack of provision for sealing, the evaluation can probably begin while deficiencies are being corrected.

If you are not able to conduct accuracy testing your system or device is probably not yet ready for an evaluation.

I have reviewed the enclosed specifications, tolerances, and test notes for the device type for which we have applied for evaluation and approval. To the best of my knowledge I have determined the device meets all applicable requirements.

Signed: _____

Date: _____

Watt-hour

4027. A. Application.

A.1. This code applies to electrical energy sub-meters used as commercial measuring devices. Sub-meters are installed in mobilehome parks, apartment houses, shopping centers and similar establishments which purchase electric service from a serving utility by a master meter and distribute the service to tenants through a sub-metered service system.

A.2. See also General Code requirements.

	Yes	No	NA
4027.1. S. Specifications.			
S.1. Construction and Workmanship. - The meter shall be substantially constructed of good material in a workmanlike manner. Each meter shall conform to all applicable standards of the National Electrical Manufacturers Association and the Edison Electric Institute.			
S.2. Cover. - The cover of the meter shall be sufficiently strong to withstand ordinary usage. It shall be dustproof, waterproof, and prevent access to the interior without destroying the security seal.			
S.3. Terminals. - The terminals of the meter shall be arranged so that the possibility of short circuits in removing or replacing the cover, making connections and adjusting the meter is minimized.			
S.4. Equipment Grounding. - Exposed non-current carrying metal parts of fixed equipment, metal boxes, cabinets, and fittings which are not electrically connected to grounded equipment, shall be grounded as required by National Electrical Code, Article 250.			
S.5. Provision for Sealing.			
S.5.1. Sealing. - Provisions shall be made for applying a security seal to the meter cover, meter sealing ring, and terminal block cover.			
S.5.2. Meter Enclosure. - Meter enclosures shall be so designed that the cover may be sealed. Provision shall be made for reading the meter without destroying the seal.			
S.5.3. Overload Protector Enclosure. - Thermal overload protector enclosures shall be designed to facilitate sealing. A provision shall be made for resetting circuit breakers or replacing fuses without destroying the seal.			
S.6. Meter Identification. - Each meter shall have the following information legibly marked on the front of the nameplate or register: (a) Manufacturer's name, type designation, and serial number. (b) Voltage rating. (c) Test amperes (TA). (d) Maximum amperes (CL). (e) Watt-hour or disk constant (kh). (f) Register ratio (Rr) and multiplier (if 10 or larger). (g) Frequency rating (Hz). (h) Number of meter elements (polyphase). (i) Ratio or rating of auxiliary devices.			

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	Yes	No	NA
4027.2. N. Notes.			
N.1. Starting Watts. - The rotor for a meter shall rotate continuously when a load is applied to 0.5 amperes.			
N.2. Meter Tests. - Meters shall be tested at full load and light load: (a) Full load test shall not be less than the test amperes (TA) of the meter. (b) Light load test amperes (TA) shall be 5 to 10 percent of the meter TA. However, it may be 20 percent or 5 amps, whichever is less, of the TA when testing a 240-volt, 3-wire, single phase meter with an unbalanced load (energizing a single current coil).			
N.3. Test Revolutions. - Full and light load tests shall require 8 or more revolutions of the test standard and at least 1 revolution of the meter under test.			
N.4. Creep Test. - A meter disk that creeps more than one revolution shall be removed from service.			
N.5. Meter Register. - A meter register shall clearly indicate the number of kilowatt-hours measured by the meter. The register ratio must be indicated on the front of registers that are not an integral part of the meter nameplate.			
4027.4. T. Tolerances.			
T.1. Application to Underregistration and to Overregistration. - The following prescribed tolerances shall be applied to errors of underregistration and errors of overregistration.			
T.2. Tolerance Values. - Maintenance and acceptance tolerances for electric watt-hour meters shall be as follows for full and light load tests: (a) Maintenance tolerance shall not exceed 2 percent for full and light loads. (b) Acceptance tolerance shall not exceed 1 percent for full and light loads. Acceptance tolerances shall be applied to new and rebuilt meters before they have been placed in service.			
T.3. Meters with Instrument Transformers. - Where instrument transformers are used, the provisions of this section shall apply to the metering equipment as a whole.			

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4027.6. Definitions of Terms.

The terms defined here have a special and technical meaning when used in the Electric Watt-hour Meter Code.

ampere. The ampere is the practical unit of electric current. It is the quantity of current caused to flow by a difference of potential of one volt through a resistance of one ohm. One ampere is one coulomb of charge per second.

creep. Creep is when the meter disk rotates continuously with potential applied and the load terminals open circuited.

current. Current is the intensity of the electron flow past any one point in the circuit. Its measurement is in coulombs per second or amperes.

kilowatt. A kilowatt is 1,000 watts.

kilowatt-hour (Kwhr). A kilowatt-hour is 1,000 watt-hours.

landlord. A corporation and/or the person or persons who own the electrical energy sub-meters and line service.

line service. The service conductors connecting the master meter to the tenant's meter and owned by the landlord.

load service. The service conductors connecting the tenant's meter to their electrical loads.

master meter. An electric watt-hour meter owned, maintained and read for billing purposes by the serving utility. All the electrical energy served to a sub-metered service system is recorded by the master meter.

maximum amperes (class or CL). The manufacturer's designated maximum amperes which a meter can measure continuously without damage or exceeding limits of accuracy. Class or the designation CL associated with its numerical value indicates maximum amperes.

meter. An electric watt-hour meter designed to measure and register the integral of an electrical quantity with respect to time.

modern meter. A meter whose disk has a magnetic bearing system.

nonretroactive. Nonretroactive requirements are enforceable only with respect to equipment that is manufactured or placed in commercial service after the effective date. *Nonretroactive requirements are printed herein italic type.*

ohm. The ohm is a practical unit of electrical resistance. It is the resistance which allows one ampere to flow when the impressed potential is one volt.

percent registration. Percent registration is calculated as follows:

$$\text{Percent Registration} = \frac{\text{kwhr measured by METER}}{\text{kwhr measured by STANDARD}} \times 100$$

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power factor. Cosine of the angle of lag or lead of the voltage and current.

register ratio. The number of revolutions of the gear meshing with the worm or pinion on the rotating element for one revolution of the first dial pointer.

serving utility. Serving utility, as used in this code, means the utility or company who sells electrical energy to landlords for resale.

sub-meter. An electric watt-hour meter owned, maintained and read for billing purposes by the landlord. All the electrical energy registered is used by the tenant.

tenant. The person or persons served electrical energy from a sub-metered service system.

test amperes (TA). The manufacturer's recommended full load test amperage.

test block. The test block facilitates safe meter testing by disconnecting the meter from the circuit without interrupting the service to the tenant.

thermal overload protector. A circuit breaker or fuse which establishes and limits automatically the maximum current that can be conducted in a circuit.

unity power factor. Unity power factor exists in alternating-current circuits when the voltage and current reverse at the same instant.

volt. A volt is the practical unit of electromotive force. One volt will cause one ampere to flow when impressed across a resistance of one ohm.

watt. A watt is the practical unit of active power and is defined as the rate at which energy is delivered to a circuit. It is the power expended when a direct current of one ampere flows through a resistance of one ohm. In an alternating-current circuit, the power in watts is volts times amperes multiplied by the circuit power factor.

watt-hour. The watt-hour is the total or integrated amount of energy delivered in one hour to a circuit in which the steady or average rate at which energy is expended is one watt.

watt-hour constant (disk constant). The watt-hour constant of a meter is the registration of one revolution of its disk expressed in watt-hours. The constant is usually identified by the symbol K_n .